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NAME: _____

$$\underline{1 \text{ in} = 2.54 \text{ cm}, \quad 1 \text{ kg} = 2.2 \text{ lbs} \quad 1 \text{ gal} = 3.79 \ell}$$

Problem 1. A right rectangular prism is 4 ft long, 2 ft wide, 3 ft deep.

- (a) What is the volume of the prism?
- (b) If a cube 6 in by 6 in by 6 in is filled with water, how many such cubes will fill the prism?

Problem 2. (a) Explain the difference between an ounce and a fluid ounce.

- (b) How many $m\ell$ are in 1 pt?
- (c) Which is more water, a pound or a pint of water? Justify.
- (d) Which is more, 1 oz or 1 fl oz of water? (1 lb = 16 oz, and 1 pt = 16 fl oz)

Problem 3. (a) How many kilograms is one million centigrams?

(b) One acre is 43,560 sq ft. What is a square mile in acres?

(c) The peregrine falcon is the fastest animal on earth, clocked diving at 80 m/sec. How fast is that in miles per hour?

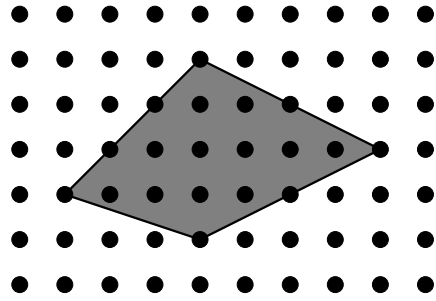
(d) The density of lead is 11 g/ml. What is that in pounds per gallon?

(e) The distance to Chicago is 800 miles. The distance to the moon is 380,000 km. How many trips to Chicago is one trip to the moon?

(f) A company produces 1500 toys per year. If one cup of glaze covers 5 toys, how many liters of glaze are needed each month?

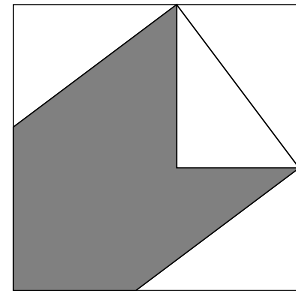
Problem 4. The diameter of a human hair is about $50\ \mu\text{m}$. ($1\ \mu\text{m}$ is called a micron. $1\ \text{mm} = 1000$ microns.) If you laid hairs that are 1 in long next to each other, how many hairs would be needed to cover 1 square inch?

Problem 5. (a) If the dots are spaced 1 cm apart, compute the area of the quadrilateral shown.



(b) What is the area of a quadrilateral with perpendicular diagonals that are 8 cm and 10 cm long?

Problem 6. Recall our proof of the Pythagorean Theorem. Given four copies of a right triangle with sides a, b, c such that $a^2 + b^2 = c^2$, what is the area of the shaded region?

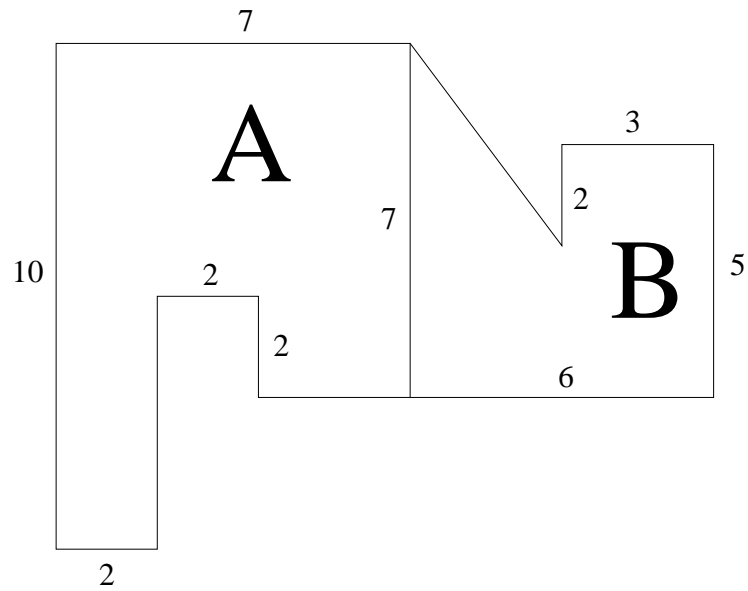


Problem 7. (a) A kite is flying on a 25 m line, and its shadow is 7 m away. If the sun is directly overhead, how high is the kite? Justify.

(b) If a triangle has side lengths 8, 15, 18, can it be a right triangle? Justify.

(c) What is the longest pole that can fit in a box that is 4 feet long, 3 feet wide, and 5 feet tall? Show work.

Problem 8. (a) Compute the area of region A. (b) Compute area of region B. Show work.



Problem 9. (BONUS) Sam reports that a plate weighs 2 lbs. Alice reports that a vase weighs 2.0 lbs. Bob can weigh things in pounds to two decimal places.

(a) If Alice weighs the plate, what weight range could she report?

(b) If Bob weighs the vase, what weight range could he report?

(c) If Bob weighs the plate, what weight range could he report?